Animal & Plant Health Agency

United Kingdom National List Trials: Trial Procedures for Official Examination of Value for Cultivation and Use (VCU) Harvest 2019

Linseed – Spring and Winter Sown

March 2019

Changes from Harvest 2018 VCU procedures

1. p9, C.6.3.5 – 1 = very late, 9 = very early.
2. p10, C.6.3.10 – “where there is evidence of combine losses at a level which will affect results” deleted.
3. p16, Appendix 3 – seed delivery date amended to 7 January.
4. p17, Appendix 4 – Trial Operators and sites: only county of trial listed. Elsoms Lincolnshire replaces Agrii Cambridgeshire/Suffolk
5. p18, Appendix 5 – Controls: winter linseed: Alpaga and Sideral replace Oliver

Contents

Section A - Summary of VCU Trial Assessments Required

Bold = Obligatory *Italics = Additional. Assessed only if requested by the applicant*

Winter linseed

Type of Character	Reference	Description of assessment
Yield	Section C	**Plot yield** **Moisture content**
Behaviour with respect to factors in the physical environment.	Section C	**Standing ability** *Plant height* *Earliness of flowering* *Maturity*
Resistance to harmful organisms	Section D	None routinely recorded
Quality characteristics (Laboratory Tests)	Section E	Oil content

Spring linseed

Type of Character	Reference	Description of assessment
Yield	Section C	**Plot yield** **Moisture content**
Behaviour with respect to factors in the physical environment.	Section C	**Maturity** *Plant height* *Earliness* *Standing ability*
Resistance to harmful organisms	Section D	None routinely recorded
Quality characteristics (Laboratory Tests)	Section E	Oil content

Further Measurements

The following must be measured or recorded in all trials, following procedures in Section C.

Sowing Date
Harvest date
Plot size
Bird Damage
Seed or Boll loss
Combine harvester losses

Section B – Seed Handling Procedures

B.1. Seed Handling Procedures

B.1.1 See GENERAL INFORMATION, SECTION 5 - Minor Crop VCU Procedures Introduction.

B.2. Authentication of VCU Seed

B.2.1 APHA will notify the Seed Handling Operator of the DUS Test Centre to which a 200 g sample of each variety of linseed should be sent for authentication.

Section C – Growing Trial Procedures

C.1. Responsibilities

C.1.1 The Growing Trial Operators are responsible for conducting the trials according to these procedures.

C.2. Site Suitability

C.2.1 The Growing Trial Operator will be responsible for providing a suitable site, which meets the following criteria:

C.2.2 The trial must be located within a commercial crop to aid management and reduce the risk of flax flea-beetle (FFB) damage. The Trials Organiser should be consulted if this proves impossible or impractical. Previous cropping must be appropriate for a linseed crop to be grown and should have no history of Fusarium wilt or likely herbicide residues that could damage the crop. There should be at least a 3 year (and preferably 5 year) gap between linseed and any other crop susceptible to sclerotinia.

C.2.3 Soil type should be typical of those on which linseed is grown locally. Soil fertility and texture should be uniform across the site. The soil should be as uniform as possible, with no substantial variations in previous cropping, ridges, furrows, etc.

C.2.4 The trial should be sited away from trees, hedges, headlands and other features, which are likely to cause uneven growth or encourage grazing damage from wild fauna.

C.2.5 The trial area should be cultivated in the direction of ploughing and drilled across the direction of ploughing and cultivation such that each plot receives similar wheeling compaction. Cultivations should follow best local practice.

C.3. Sowing the Trial

Time of sowing is critical for rapid emergence and to reduce the risk of damage by FFB. As a guideline, trials should be drilled between the last week of March and the 3rd week of April when soil temperatures reach 8ºC and conditions are conducive to rapid and even establishment. To reduce FFB losses the drilling of the trial should coincide as closely as possible with that of the host crop of linseed. Seedbeds need to be well prepared but avoid excessive passes, over-consolidation and compacted soil. Prepare and compress the linseed seedbed so that moisture levels are preserved and even (especially on light soils). The trial can then be drilled when conditions are optimum.

Rolling after drilling is usually necessary and beneficial on lighter and stony soils. Heavier soils should be rolled if there's a risk of moisture loss but it is essential to avoid capping.

Trial Managers must check the emerging crop regularly and, if, necessary, spray for FFB.

C.3.1 **Plot Size**

C.3.1.1 The harvested plot area per variety should be not less than 20 m² per replicate for trials with a minimum of 3 replications. Plots should be drilled to a greater length than required and cut back to the required length prior to harvest. The plot width for calculating harvested area is measured centre gap to centre gap with an inter-plot gap in the range 0.5 m to 0.8 m.

C.3.2 **Plant population**

C.3.2.1 The target plant population is 400 plants per m², but should not exceed 600 viable seeds/m² based on thousand seed weight and germination.

The following formula will be used to calculate the seed rate for a given thousand seed weight:-

$$\text{Seed rate (kg/ha)} = \frac{(\text{Target population} \times \text{Thousand seed weight}) \times 100}{(\text{Establishment \%} \times \text{Germination \%})}$$

For operators using seed counters the following formula can be used to calculate required seed numbers per plot:-

$$\text{Seeds per plot} = \frac{(\text{Target population} \times \text{Drilled plot area}) \times 10{,}000}{(\text{Establishment \%} \times \text{Germination \%})}$$

The likely establishment should be judged carefully depending on soil conditions and seedbeds. Growing Trial Operators are responsible for achieving the correct target populations.

C.3.3 **Trial Seed**

Untreated seed must be sent as set out in accordance with the Seed and Fee Notice, directly to the Seed Handling Operator by the deadline set out in appendix 3.

When drilling, every effort should be made to obtain even emergence.

C.3.4 **Trial layout**

C.3.4.1 The Trials Organiser following consultation with APHA produces provisional sowing lists. The Trials Organiser will make final sowing lists available to Growing Trial Operators, along with the trial plans produced by the Trial Design and Data Handling Operator.

C.3.4.2 The trial should be sown according to the plan produced by the Trial Design and Data Handling Operator and may be an incomplete block design. In an incomplete block design each replicate is split into a number of sub-blocks. Any splitting of replicates must be between sub-blocks and not through sub-blocks. Varieties can be moved within a sub-block but must not be moved from their sub-block. Varieties must not be moved around within the plan e.g. if drilling errors occur. If plots are moved out of their original sub-block they will have to be treated as missing plots. If there are any queries please contact the Trials Organiser.

C.3.4.3 If there is a need to replace a planned variety e.g. if varieties are withdrawn, affected plots must be sown with any of the standard control varieties. Any such replacements must be agreed with the Trials Organiser. The control varieties are listed in Appendix 5.

C.3.5 **Drilling**

C.3.5.1 Care must be taken with drill settings and drilling speed to ensure satisfactory and uniform establishment and plant population from plot to plot.

Drill at 1.5 – 4cm into moisture in a firm and fine seedbed. Due to the very high risk of damage by flea beetles trial managers are advised to wait until conditions are conducive to good germination and rapid growth. It is also important to ensure that there is no carryover of seed between plots.

C.3.5.2 At least one discard plot must be drilled on either side of the trial with the same drill and at the same time that the trial is drilled.

C.3.5.3 Precautions must be taken to avoid any missing rows. Any missing rows or parts of rows must be noted in the trial diary and reported to the Trials Organiser within one month of emergence.

C.3.6 **Confirmation of trial layout**

C.3.6.1 After full establishment and within two months of sowing (autumn sown trials) or one month of sowing (spring sown trials) , the Growing Trial Operator must confirm that the trial has been sown to plan or give details of any changes to plan. This should be done by clearly highlighting the changes in the electronic plan and returning it to the Trial Design and Data Handling Operator.

- Return a completed site data 1 sheet including the following information:
- Site location details including how to get to the field.
- Sketch showing the layout of the trial in the field, in relation to other trials and showing access roads, gates, etc.
- Trial sketch showing plot numbers and variety codes/and or names.
- A short post-establishment report of the condition of the trial.

C.4 Husbandry

C.4.1 **Agronomy**

Where not specified in these procedures agronomy should follow best local practice, advisory and regulatory guidelines. Application of fertilisers and sprays should be uniform. It is normally best to apply these across the direction of the plots. Application wheelings should not run through the harvested plot area.

C.4.2 **Fertiliser application**

It should take into account inherent fertility, previous cropping, winter rainfall, the best local practice. All fertiliser applications should take account of AHDB Nutrient Management Guide (RB209), the corresponding advisory publications in England, Wales, Scotland and Northern Ireland and past trialling experience.

A typical rate of nitrogen is to use 100–125 kg/ha minimum (including SMN) as a split application; 60% when the rows are visible and 40% when 20cm tall / greed bud visible.

Trial managers should be aware of other nutrient requirements and should be prepared, if necessary, to apply appropriate treatments.

C.4.3 **Herbicides**

The herbicides to be used must be discussed with the Trials Organiser.

Chemicals should not be used to which any variety is known to be sensitive. Pre-emergence herbicides should be used and it should be noted that under certain soil and weather conditions the linseed crop can be intolerant of some approved post-emergence herbicide products. Post-emergence sulfonyl urea products can be damaging and should be avoided.

The following factors should be considered:

Approved pre-emergence herbicides are effective (eg Mesotrione - Callisto) with good (moist) seedbed conditions and with the appropriate application technique (e.g. water volume). Approved post-emergence herbicides (eg Bentazone – Basagran) can be effective against annual dicotyledons.

Post-emergence herbicide applications should be made when all varieties are taller than 15 cm (but always check the product label for any product variations on this). The risk is greater on light soils (e.g. chalks) and no variety should not be shorter than 10 cm.

Most damage is likely when soils are very dry and/or during extremes of temperature especially very hot conditions.

Experience has shown that the use of the following products can lead to damage and should be avoided:

Metazachlor eg Butisan
Metazachlor + quimerac eg Katamaran
Napropamide eg Devrinol
Bifenox eg Fox

Use the minimum dose that will kill the weeds.

C.4.4 **Growth Regulators**

Plant growth regulators should not be used on linseed trials.

C.4.5 **Pest and Disease Control**

C.4.5.1 **Pest Control**
Adequate measures should be taken to prevent or minimise damage by any pest. FFB, in particular, are likely to be a significant pest during establishment and trial managers must ensure that adequate pre- and/or post-emergence control measures are taken.

Assessments should be made wherever pest damage occurs since decisions have to be made on the validity of each plot affected.

For seed dressings, see appendix 2.

C.4.5.2 **Disease control**

The aim of fungicide application to linseed trials is a compromise between controlling severe outbreaks of disease which might invalidate the trial yields, and allowing sufficient disease development to permit the assessment of varietal differences. Precautions should be taken to prevent disease levels in excess of about 10% leaf area cover, or about 10% of capsules infected, by applying appropriate fungicides according to the available approvals and label recommendations. Any disease which does develop should be recorded as described in Section E. The diseases which are most likely to be encountered are *Botrytis* spp. and *Alternaria* spp. in wet seasons, and Powdery Mildew in dry seasons.

C.4.6 **Irrigation**

If irrigation is required to establish the trial, seek the specific agreement of the Trials Organiser.

C.4.7 **Pathways**

Internal pathways should be made after the risk of pigeon damage has passed.

C.5 Harvesting

C.5.1 **Timing of harvesting**

It is the Trial Manager's responsibility to ensure that plots can be harvested without damaging neighbouring plots and without contamination: plots should be separated adequately as required.

C.5.2 **Harvesting method:**

C.5.2.1 Trials should be desiccated prior to combining unless there is a reason for not doing so, the control varieties must be at an overall suitable stage of development.

C.5.2.2 Plots should be trimmed to their final length prior to harvesting. The plot dimensions must be measured prior to harvesting. If it is necessary to reduce the size of any plot at harvest give clear details on the yield file. Individual harvested plot lengths should be recorded.

C.5.3 **Samples**

C.5.3.1 Samples are required from all plots for moisture determination using the oven method and oil content determination. If additional samples are required they will be notified to the Growing Trial Operator by the Trials Organiser. All samples should be labelled with the labels provided, giving variety name/breeders reference, AFP number, replicate number and Growing Trial Operator identification number.

C.5.3.2 It is essential that all samples:

- Are representative of the variety/plot from which they are taken with minimal contamination. When sampling on-combine, it is essential to minimise the risk of contamination of grain from the previous plot.
- Are taken from the same source.
- Contain the weight of grain requested.

C.5.3.3 A single sample of 200 g sample should be taken in a polythene bag for moisture content and oil content determination. One label should be placed inside the bag and this sealed by rolling over the top and securing the bags and the second labels with rubber bands.

C.5.3.4 All bagged samples must be kept in good condition at a moisture content and temperature appropriate for long term storage. They should be clearly marked both inside and outside the container/bag.

C.5.3.5 Sample drying should be undertaken using a cold/warm air drier to reduce moisture content to 9% or below.

C.5.3.6 All plot samples must be labelled with the trial identification number, variety name/breeders reference, AFP number, plot number and Growing Trial Operator identification number

C.5.4 **Submission of data and samples**

C.5.4.1 Appendix 6 lists the records, with deadlines, to be sent to the Trials Organiser. Diary sheets and any other field records should be returned to the Trials Organiser within 5 working days of harvest.

C.5.4.2 All plot records should be transmitted to the Trial Design and Data Handling Operator following the deadlines set out in Appendix 6. The Growing Trial Operator should ensure that data are free from errors before transmission. After scrutiny, copies of results will be returned to the Growing Trial Operator for action as agreed by the Trials Organiser.

C.5.4.3 All samples should be sent to the appropriate Quality Testing Operator following the deadlines set out in Appendix 6.

C.6. Records

6.1 There are four components:

1. **Diary** Field notes of trial status.

2.* **Site data part 1** Including full location details:
   1) map of site location showing nearby settlements and roads,
   2) a sketch showing the layout of trials in the field with access points and
   3) trial layout, showing plot numbers and variety codes/names.
   4) trial diary.

3.* **Site data part 2** Details of agrochemical applications and irrigation.

4. **Plot records** Plot data.

* Template available from Trials Organiser

C.6.1.1 An entry in the Diary sheet should be made on every trials visit and any observations relevant to variety performance should be recorded. If the trial is in good condition, with no problems, this should be recorded.

C.6.2 **Plot records**

C.6.2.1 Plot data may be recorded direct onto a data logger using a system approved by the Trials Organiser or recorded on paper then entered and validated onto a computer using an approved system. A system of ensuring that data are recoverable, in the event of loss of original data, must be implemented, e.g. copy and safe storage. Whichever method is used, individual plot data will only be accepted by the appropriate Trial Design and Data Handling Operator in an approved format using the AFP number, variety name and units as listed in Sections C and D.

C.6.2.2 All observations should be checked at the time of recording to identify any unusual plot performance. These observations should be noted by the recorder and any possible causes identified, together with a recommendation for whether the data should remain in the analysis or should be excluded.

C.6.2.3 Plot numbers on record sheets must correspond with the numbering on the field plan.

C.6.2.4 If a character is not recorded or is missing the Growing Trial Operator should indicate in the diary or on the recording sheet the reason why it has been excluded.

C.6.2.5 Where a plot record is missing the Growing Trial Operator should record this in any data file or hard copy medium as a symbol thereby indicating there is no recorded value associated with this plot.

C.6.2.6 Specific plot records should be made as counts or on the scales shown for each character. Only the character names as listed may be used. All records should be returned to the Trial Design and Data Handling Operator as soon as possible after they are completed to trials@ahdb.org.uk

C.6.2.7 All records must be returned as soon as reasonably possible and when complete for the whole trial. Indicative deadlines are given in Appendix 6. All records must be returned by the final deadlines.

C.6.3 **Procedures for recording Characters**

The following procedures must be followed for measuring all characters to be used in NL decision-making.

C.6.3.1 **PLOT YIELD AND MOISTURE CONTENT (OBLIGATORY) (kg)**

The following information must accompany the yield data:

The moisture content % of the harvested grain, determined by oven method.

Plot length: the plot length harvested in metres.

Plot width: the width of the harvested plot in metres from outer row to outer row plus half of the inter-plot gap on either side. The adjustment for the inter-plot gap should be no greater than 0.8 m.
If these are not the same for every plot a separate record must be submitted.

Growth stage: usually 9.9 at harvest. The Growth Stage Chart for linseed is at Appendix 7.

Yield (in kilograms). Note clearly any tare weight to be subtracted.
Yield, moisture content, plot length, plot width and harvest date should be sent to the appropriate Trial Design and Data Handling Operator within 5 days of harvesting the trial.

C.6.3.2 **STANDING ABILITY from all plots (Winter linseed - OBLIGATORY)(1-9)**
(*Spring linseed - ADDITIONAL***)**

1 very poor
9 very good

Growing Trials Operators should assess standing ability at a stage that provides good discrimination between varieties and be prepared to repeat the assessment if further lodging develops.

C.6.3.3*PLANT HEIGHT from all plots (ADDITIONAL) (cm)*

Record average plot height at the end of flowering before leaning or lodging takes place. If lodging has occurred, choose a representative area of the plot, lift a number of plants against the measuring pole and record an average height.

C.6.3.4 *EARLINESS from all plots* *(ADDITIONAL)* *(1-9)*

1 very late
9 very early

Record when the earliest variety is in full flower and score all varieties relative to this. An assessment on one occasion is normally sufficient. Estimate the date of full flowering for the earliest control variety.

C.6.3.5 **MATURITY from all plots** **(Spring linseed - OBLIGATORY)** **(1-9)**
(*Winter linseed - ADDITIONAL***)**

Maturity should be judged by making a visual estimate of canopy senescence, where;

1 very late
9 very early

Unrepresentative areas of the plot should be avoided when making assessments, for example, localised diseased infections.

C.6.3.6 **SOWING DATE of each trial** **(OBLIGATORY)** **(Day/month/year)**

This is recorded in Part 1 of the Site Information Form.

C.6.3.7 **HARVEST DATE** **(OBLIGATORY)** **(Day/month/year)**

This is recorded in part 2 of the Site Information Form.

C.6.3.8 **BIRD DAMAGE from all plots** **(OBLIGATORY)** **(1-9)**

1 all plants severely damaged
9 no plants damaged

Indicate the cause of damage and, in the Diary section, what action has been taken to minimise further damage.

C.6.3.9 **SEED (or BOLL) LOSS from all plots** **(OBLIGATORY)** **(1-9)**

1 severe seed loss
9 no seed loss

and give an estimation of maximum % seed loss/boll loss.

Record before harvest if serious loss has already occurred. Base scores either on observation of boll loss or counts on the ground. Ensure that combines are set correctly to minimise losses at harvest. Assess any serious combining losses after harvest.

C.6.3.10 **COMBINE LOSSES from all plots (OBLIGATORY) (1-9)**

This must be recorded.

9 = no combine losses. Combine losses should be assessed if the losses are thought sufficient to exclude the yield data from results. Indicate the estimated number of grains lost per m^2 for the lowest score given on the 1 to 9 scale.

C.6.3.11 **Site Factors**

Any factors which may have affected the yield of the trial or individual plots must be noted and accompany the yield data.

Where varietal differences are seen in pest or disease attack, records should be made either as an estimated % of plants affected or as % leaf area attacked in accordance with the procedure in Section D for disease.

Records for other scores should be taken as % plants affected or on a 1 to 9 scale. Include definitions of 1 to 9 on the scale.

C.6.3.12 Trial Inspection

All trials will be inspected by the Trial Inspection and Technical Validation Operator and, in some cases, it may be necessary to visit on more than one occasion.

The requirements for Growing Trial Operators in respect of inspections are to:

1. Give inspectors reasonable access to trials and to provide full location and site details (if not already given with site data1).
2. Provide the inspector with information (for example pesticide sprays applied etc) within seven days of a request.
3. Co-operate with the inspector in making any non-routine assessments required to establish the validity of the trial (for example population counts).
4. Carry out any action agreed in consultation with the inspector. In particular it is important that any requirement to shorten plots is undertaken. The data on plots that the trials operator and inspector agree to exclude should not be submitted.

Section D - Disease Testing Procedures

D.1. Assessment of Natural Infection

D.1.1 **Disease Observation Tussocks**

No disease observation tussocks are carried out routinely.

D.2. Naturally Occurring Disease in VCU Growing Trials

D.2.1 If disease levels increase to levels more than 5% of the leaf area (or 5% of infected plants as appropriate for the diseases) on the most affected variety a score should be made and sent to the Trials Organiser. Confirmation of the identity of a disease should be obtained from an appropriate plant pathologist if required. If disease infection persists, successive records should be made through the season.

D.2.1.1 The disease most likely to be encountered is Powdery mildew (O*idium lini*), though both *Alternaria* and *Botrytis* may cause infections on the leaves. Capsules are most likely to be affected by *Alternaria* and *Botrytis.* Stem and whole plant symptoms are most likely to be caused by *Verticillium*, *Sclerotinia*, *Mycosphaerella* (Pasmo disease), *Phoma*, Fusarium wilt and other *Fusarium* diseases.

D.2.2 **Recording methods**

D.2.2.1 Timing of assessments

A guide to probable assessment times is given below;

Disease	Seedling/ Vegetative	Flower bud	Flowering	Capsule formation	Pre-maturity
Powdery mildew %		✓	✓	✓	
Botrytis %		✓	✓	✓	
Alternaria %			✓	✓	
Fusarium %	✓	✓	✓	✓	
Fusarium wilt %	✓		✓		
Verticillium %				✓	✓
Sclerotinia %			✓	✓	
Phoma %	✓	✓	✓	✓	
Mycosphaerella %				✓	✓

D.2.2.2 Appropriate assessment keys are given in Appendix 8. All disease records to be sent to the Trial Design and Data Handling Operator as soon as they are made.

Disease data should be received by 13th August

D.3. Inoculated Disease Tests

No inoculated disease tests are carried out routinely.

Section E - Quality Testing Procedures

E.1. Responsibilities

E.1.1 The Quality Testing Operator appointed by the Trials Organiser is responsible for conducting approved quality tests according to these procedures.

E.2 Quality Assessment Methodology

E.2.1 **Moisture content determination**

The following procedure must be followed:

A 105 g *sample (*± 5g) is placed in the drier which must be at a temperature of 100°C ±4°C with the air recirculator set in the range 80-100% recirculation in order to restore the temperature to 100°C ±4°C as rapidly as possible. When the temperature is restored to 100°C ±4°C the air regulator is set at 80% recirculation i.e. 20% fresh hot air. The air regulator is critical for even rapid drying. The samples are dried at 100°C ±4°C for such time as is necessary for complete drying.

The dried sample is carefully removed from the drier as soon as the sample is cool enough for accurate weighing. The dry weight is recorded to one decimal place.

When all samples from a given trial have been recorded, the fresh and dry weights are immediately reported to the Trials Organiser electronically using the character names given in Section D10.3. When the dry weights are reported as a percentage, the fresh weight should be reported as 100.

Moisture content determination by conductance moisture meter is not acceptable to the Testing Authority.

E.2.2 **Oil Content determination**

Analysis is performed using continuous emission NMR following ISO 5511:1992. Results are expressed as apparent oil as a percentage at 9% moisture.

The stability of the equipment is checked at two-hourly intervals through the working day by the use of weighed oil standards. A single determination is normally performed on each test sample.

Section F - Trial Design and Data Handling Procedures

F.1. Plan Validation and Storage

F.1.2 After the trial has been drilled, the Growing Trial Operator must:

a) Confirm that the trial has been drilled according to plan and provide the sowing date, by returning site data 1 and associated trial sketch to the appropriate Trial Design and Data Handling Operator.

b) If any amendments to the plan have been made, return a hard copy of the plan to the appropriate Trial Design and Data Handling Operator with any amendments clearly indicated. Alternatively, amendments may be notified electronically with the agreement of the Trial Design and Data Handling Operator.

F.1.3 The Trial Design and Data Handling Operator will check these for statistical validity and, once this has been done, will load the plan on the database.

F.2. Data Recording

F.2.1 Data are recorded using the methods and characters given in Sections C, D and E.

F.2.2. Site information is recorded for each trial including, for example, data on previous cropping, seed rates, soil details and fertiliser applications.

F.2.3 Details of any agrochemical applications are also recorded and forwarded to the Trials Organiser.

F.3. Data Processing

F.3.1 Processing of individual agronomic and disease variates.

F.3.2. A list of the agronomic, yield and disease variates, which may be recorded and processed, are specified in Sections C, D and E. After scrutiny, copies of the results will be returned to the Growing Trial Operator for action as agreed by the Trials Organiser

F.4. Other Tests and Trials

F.4.1 Any additional or alternative designs required for the assessment of additional VCU characters not detailed in Annex A of the **MINOR CROPS VCU TRIAL PROTOCOL** will be added to these **Procedures** as and when approved by the NLSC.

Appendix 1 - Approved Trial Organisers/Operators for Linseed

Activity	Organisers/Operators Responsible
Trials Organiser	BSPB
Seed Handling Operator	NIAB
Trial Design and Data Handling Operator	AHDB Cereals and Oilseeds
Pathology Trials Operator	None
Trial Inspection and Technical Validation Operator	AHDB Cereals and Oilseeds
Quality Testing Operator	NIAB
Data Review and Standard Setting Operator	NIAB

Appendix 2 - Seed Treatment Products for Use on NL Trials

To be advised.

Appendix 3 - Seed Despatch Deadline Dates

VCU seed must be delivered to NIAB by:

NL Winter linseed	17th August
NL Spring linseed	7th January
DL Spring Linseed	last Wednesday in February

Appendix 4 - Growing Trial Operators and Trial Locations

1. Growing Trial Operators/Seed Handling Operators

Winter Linseed

Growing Trial Operator	Seed Handling Operator (If not trial operator)	Location of Trial
NIAB		Cambridgeshire

Spring Linseed

Growing Trial Operator	Seed Handling Operator (If not trial operator)	Location of Trial
NIAB	NIAB	Kent
Envirofield	NIAB	Hampshire/Wiltshire/Dorset
Agrii	NIAB	Essex
Elsoms	NIAB	Lincolnshire
Elsoms	NIAB	Lincolnshire.

2. Pathology Trials Operator

Pathology Trial Operator	Location of Trial
Not applicable	-

Appendix 5 - Control Varieties for VCU Assessments

Winter Linseed

Alpaga
Sideral

Spring Linseed

Batsman
Abacus
Aquarius

Appendix 6 - Dates by which Records should be Submitted

A. To Trials Organiser

Record	Latest date of receipt by Trials Organiser
Site data part 1 (including site sketch)	Within 2 months of drilling trial (autumn sown trials) Within 1 month of drilling trial (spring sown trials)
Site data part 2	By the time trial is harvested
Plot records (in approved electronic format)	Growing Trial Operator should notify Trials Organiser that trial has been harvested within 2 days of harvest

B. To Data Handling Operator

Record	Date
Plot records should be sent to Data Handling Operator	Within 10 days of record being taken

C. To Quality Testing Operator

Samples	Date
Plot samples for quality testing should be sent to the Quality Testing Operator	Within 2 days of harvest

Appendix 7 - Growth Stages of Linseed

	Growth Stage	
Germination And Emergence	0.0	Dry seed
Leaf Production	1.0	Both cotyledons unfolded and green
	1.1	First true leaf emerged
	1.2	Second true leaf emerged
	1.3 etc	Third true leaf emerged
Stem Extension	2.0	No internodes (rosette)
	2.5	About five internodes
Flowerbud Development	3.0	Only leaf buds present
	3.1	Flower buds present but enclosed by leaves
	3.3	Flower buds visible from above ('green bud')
	3.5	Flower buds raised above leaves
	3.6	First flower stalks extending
	3.7	First flower buds yellow ('yellow bud')
Flowering	4.0	First flower opened
	4.1	10% all buds opened
	4.3	30% all buds opened
	4.5	50% all buds opened
Pod Development	5.3	30% potential pods
	5.5	50% potential pods
	5.7	70% potential pods
	5.9	All potential pods
Seed Development	6.1	Seeds expanding
	6.2	Most seeds translucent but full size
	6.3	Most seed green
	6.4	Most seed green-brown mottled
	6.5	Most seeds brown
	6.6	Most seed dark brown
	6.7	Most seed black but soft
	6.8	Most seed black and hard
	6.9	All seeds black and hard
Leaf Senescence	7.0	
Stem Senescence	8.1	Most stem green
	8.5	Half stem green
	8.9	Little stem green
Pod Senescence	9.1	Most Pods Green
	9.5	Half pods green
	9.9	Few pods green

Appendix 8 - Assessment of Linseed Diseases

The following key is suitable for foliar and capsule diseases. For stem diseases such as Sclerotinia, and Verticillium an assessment of the % of stems infected per plot should be made.

1) Examine all leaves and capsules in 3 areas of each plot.
2) Ignore all naturally senescent tissue.
3) Include all necrosis and chlorosis attributable to disease.
4) Estimate % infection using the descriptions below. Record the average % infection from the 3 areas. Interpolate values if necessary.

% Infection	(1-9) score	LEAVES	CAPSULES
0	1	No infection observable	
0.1	2	Trace of infection	
1	3	Diseased leaves with 1 small lesion; plants with a few scattered lesions	Terminal raceme with a few scattered lesions
5	4	Leaves appear 1/10 infected; diseased leaves with 2 lesions	Terminal raceme appears 1/10 infected; diseased capsules with 1 or 2 lesions
10	5	Leaves appear ¼ infected; diseased leaves With few large or many small lesions	Terminal raceme appears ¼ infected; diseased capsules with 2 or more lesions
25	6	Area appears ½ infected ½ green	
50	7	Area appears more infected than green	
75	8	Very little green tissue left	
100	9	Leaves/capsules dead - no green tissue left	

This publication is available at www.gov.uk/government/publications

Any enquiries regarding this publication should be sent to us at

webmaster@apha.gov.uk

www.gov.uk/apha

The Animal and Plant Health Agency (APHA) is an executive agency of the Department for Environment, Food & Rural Affairs, and also works on behalf of the Scottish Government and Welsh Government.